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# Solute Transport through the Saturated Zone of a Hillslope:

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The regularly observed decoupling between the hydrologic response of a catchment and its chemograph raises questions on how catchments store solute. Storage of solute occurs within the hillslopes and streams that comprise the catchment. However, residence times of solute in hillslopes are typically much larger than in stream water. Therefore, a better understanding of solute storage in hillslopes is beneficial for understanding the solute response of catchments.

The role of hillslope geometry on hydrologic response has long been established. Since the hydrologic response does affect solute transport, it is plausible that hillslope geometry affects solute transport as well. The distribution of differently shaped hillslopes in a catchment is not random; hence, it is to be expected that the effect of hillslope geometry on solute transport becomes more pronounced on catchment scale.

The objective of this research is to assess the role of hillslope geometry on transport of inert tracers. This is done with a numerical solution to a semi 2D convection dispersion equation. On a hillslope with a length/depth aspect ratio equal to 100, the advective velocity of solute may be considered one dimensional. The hillslope storage Boussinesq model is used to calculate hillslope drainage. With this model, it is possible to produce drainage of hillslopes with different geometries. Local dispersion is modelled in two directions, along the length of the hillslope and along the soil depth. Differ-

ent values for dispersivity are considered. The model calculates transport through the saturated zone under hydrological steady state conditions. Initially, the distribution of solute throughout the hillslope is uniform.

Results suggest that changes in distribution of solute throughout the hillslope differ among hillslopes of different geometry. Solute discharge as a function of time is affected by both hillslope geometry and local dispersivity. The relative importance of these two factors can be quantified.